MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Larry Hogan, *Governor*
Boyd Rutherford, *Lt. Governor*
Mark Belton, *Secretary*
Joanne Throwe, *Deputy Secretary*

January 11, 2016

By email and first class mail to:

Susan Mackert
Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193
susan.mackert@deq.virginia.gov

Re: Comments on Draft VPDES Permit No. VA0002071 for Possum Point Power Station

Dear Ms. Mackert:

The Maryland Department of Natural Resources (MDNR) appreciates the opportunity to comment on the draft Virginia Pollutant Discharge Elimination System (VPDES) Permit for Dominion Virginia Power's Possum Point Power Station, VPDES Permit No. VA0002071. Although the comment period has expired, the Virginia Department of Environmental Quality (VADEQ) has indicated in phone conversations with MDNR personnel that these comments will nevertheless be accepted for consideration.

When coal ash is mixed with water, the toxins in the coal ash are leached into the water. The ash ponds at Possum Point contain slurry of coal ash and wastewater that can leach pollutants into groundwater and surface water. The draft permit as currently written has the potential to cause significant harm to human and aquatic life. The proposed discharge concentrations, methodology used to calculate average concentrations, and lack of any discharge limitations for Ash Pond D (Outfall 010) in the draft permit indicate potential to adversely impact human and aquatic life even though the Permit may technically satisfy regulatory standards.

The MDNR understands the need to remediate the existing coal ash ponds to comply with the Environmental Protection Agency's (EPA's) *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule* (Final Rule). However, allowing the discharge of an unknown quantity of wastewater from coal ash ponds into Quantico Creek and the Potomac River with little or no treatment of the toxic chemicals contained in the leachate is not in keeping with the spirit or intent of the Final Rule. DNR would prefer that leachate from coal ash ponds be treated to reduce the concentrations of pollutants below toxic levels prior to discharging into adjacent waterways. Transporting the dry coal ash to a properly constructed, lined facility located away from rivers and streams would greatly reduce the potential for groundwater and surface water contamination.

We respectfully request a response to the following questions and concerns regarding potential adverse impacts to human health and aquatic life resulting from exposure to the toxic substances in the leachate currently discharging from the Possum Point Power Station coal ash ponds and the discharges proposed in the draft permit. We further request that the draft permit be modified to the extent practicable to, address the concerns outlined in this comment letter. Finally, we respectfully request that that these comments become part of the public record for the draft permit.

Human Health

Coal ash is a byproduct of burning coal for electricity. It is a fine, powdery, grey material containing concentrated levels of various constituents found in coal. These include heavy metals such as arsenic, lead, mercury, cadmium, chromium and selenium, aluminum, antimony, barium, beryllium, boron, chlorine, cobalt, manganese, molybdenum, nickel, thallium, vanadium, and zinc. Many heavy metals are toxic to human and aquatic life at high concentrations. According to Physicians for Social Responsibility, these metals can adversely affect human health when eaten, drunk, or inhaled. The effects of exposure to these toxicants include cancer and nervous system impacts, heart damage, lung disease, respiratory distress, kidney disease, reproductive problems, gastrointestinal illness, birth defects, and impaired bone growth in children.

The following quote from EPA's Final Rule to regulate the disposal of coal combustion residuals (CCR) summarizes the findings of EPA's risk assessment modeling for constituents of potential concern (COPC) in CCR:

> *"Based on the results of the probabilistic analysis, EPA concludes that leaching from CCR waste management units has the potential to pose risk to (human and ecological) receptors. Arsenic, lithium, and molybdenum are the chemical constituents found to pose the greatest risks from surface impoundments, while arsenic posed the greatest risks from landfills. Available toxicological profiles indicate that risks from arsenic ingestion are linked to an increased likelihood of cancer in the skin, liver, bladder and lungs, as well as nausea, vomiting, abnormal heart rhythm, and damage to blood vessels; risks from lithium ingestion are linked to neurological and psychiatric effects, decreased thyroid function, renal effects, cardiovascular effects, skin eruptions, and gastrointestinal effects; and risks from molybdenum ingestion are linked to higher levels of uric acid in the blood, gout-like symptoms, and anemia."*

Additional sensitivity and uncertainty analyses revealed that specific disposal practices for CCR resulted in greater risks than those identified in the modeling. In particular, "EPA identified higher risks for arsenic, lithium, and molybdenum, as well as additional risks for thallium," when CCR was stored in unlined surface impoundments. Four of the five ponds at Possum Point are unlined. Pond D has a clay liner. Although disposal of CCR waste in clay-lined ponds can minimize risks to human heath and the environment, clay-lined ponds are often inadequate to completely prevent toxic contaminants from leaking into groundwater or surface water. The EPA has stated that, "Composite liners (are) the only liner type modeled that effectively reduced risks from all pathways and constituents far below human health and ecological criteria in every sensitivity analysis conducted."

The EPA concluded that, "(the) current management practice of placing CCR waste in surface impoundments and landfills poses risks to human health and the environment." Disposal of CCR wastes in unlined surface impoundments posed the greatest risk to human health and the environment. Sensitivity analyses indicated higher risks for arsenic, boron, cobalt, fluoride and mercury at more acidic and basic pH values. These findings are important and relevant because acidic conditions can occur when CCR is disposed of in the same area that contains coal waste and basic conditions result when CCR and flue gas desulfurization (FGD) waste products are disposed of together.

A total of 157 CCR damage cases were documented in EPA's Final Rule. The total includes 40 proven damage cases, 113 potential damage cases, and 4 additional cases from Wisconsin with insufficient information to designate as either potential or proven. The EPA concluded that the number of CCR damage cases was higher than previously thought and is likely to increase as additional monitoring wells are installed, surface impoundments (i.e. wet disposal) pose the greatest risk to groundwater and surface water, unlined impoundments are directly correlated with the highest risks to groundwater (while also noting that a significant percentage of CCR impoundments constructed in the past two decades continued to be built without a protective liner), and inactive surface impoundments that have not been properly remediated and closed continue to pose a significant risk to human health and the environment.

Aquatic Life

Dr. Dennis Lemly, Research Associate Professor of Biology at Wake Forest University and an expert on aquatic pollution from coal ash and coal mining, evaluated the aquatic ecological impacts of the toxic pollutants in coal ash in his report titled, "*Technical and Toxicological Evaluation of Coal Ash Pond Dewatering Permit Proposed for Possum Point Power Station, Virginia.*" Following is a summary of the report's findings:

- Fifteen elements were reviewed for their toxicity to fish and wildlife: arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.
- Dr. Lemly compared toxic threshold values for the metals (from peer-reviewed scientific literature, EPA guidelines issued under the CWA, or enforceable standards adopted by Virginia and Washington) to the maximum discharge concentrations listed in the draft permit.
- Ten of the eleven metals regulated by the draft permit were rated as a high ecological hazard to fish and wildlife by Dr. Lemly at the discharge concentrations allowed in the draft permit.
- Four of the fifteen metals reviewed in the report (barium, cobalt, manganese, and vanadium) are not included in the draft permit and therefore are not measured, monitored, or regulated at all. These metals are found in coal ash and are significant pollutants in coal ash wastewater.
- Direct waterborne exposure would be the primary exposure route for fish and wildlife for all the metals reviewed with the exceptions of mercury and selenium.
- According to published EPA guidance, the allowed discharge concentration in the draft permit for copper (18 micrograms/liter) is sufficient to kill 20-50% of a wide variety of aquatic organisms (including fish, mussels, crustaceans, worms, snails, and clams) within 48-96 hours of exposure.
- Selenium and mercury bioaccumulate within individual organisms and biomagnify as trophic level increases in aquatic and terrestrial food chains. The allowed discharge concentration of selenium in the draft permit (15 micrograms/liter) is approximately five times the EPA draft freshwater criterion for selenium (3.1 micrograms/liter) in lotic habitats such as the Quantico and Potomac Rivers.
- Dr. Lemly notes that, "dietary selenium readily accumulates in tissues, sometimes to levels that are several thousand times the initial waterborne concentration" and "there are notable recent case examples in (North Carolina) of toxic bioaccumulation when waterborne selenium concentrations were only 2 – 3 micrograms/liter." Figures included in the report show the effects of selenium poisoning on bluegill sunfish (*Lepomis macrochirus).* The effects of selenium poisoning include a deformed mouth, skull, and gill cover.
- Selenium toxicity could increase downstream due to bioaccumulation. Most pollutants decrease in concentration due to dilution and therefore become less hazardous downstream of the release site. Selenium has the potential to bioaccumulate in aquatic and terrestrial food chains and could become a greater hazard in downstream impoundments and wetlands. According to Dr. Lemly, " Ecological risk factors for selenium are much more numerous and complex than those for the 'waterborne group' such as copper and nickel. Hazard assessment for this pollutant must therefore take into account all aspects of selenium transport, cycling, biological uptake, and toxicity." The draft permit does not include any monitoring requirements for downstream, lentic, aquatic habitats where selenium bioaccumulation would be maximized.
- The report concludes that the allowed discharge concentrations in the draft permit are "ecologically unacceptable" and would release "concentrations of pollutants that are above high toxic levels to fish and wildlife" into Quantico Creek and the Potomac River.

Quantico Creek is located at the head of the striped bass spawning and nursery area. The following paragraph is taken from the *Ecosystem-Based Fisheries Management for Chesapeake Bay: Striped Bass Background and Issue Briefs* (2009) document:

"During egg development (oogenesis), diverse lipophilic contaminants are transferred from maternal
tissues of fish to their eggs (Longwell et al. 1996). Contaminant-laden yolk material of the egg is then used during development of the embryo and larva. Maternal transfer of anthropogenic chemicals such as organochlorine pesticides (DDT, mirex) and industrial chemicals (PCBs) disrupt endocrine function associated with reproduction and are associated with inhibition of oocyte development, inhibition of spawning, reduced egg weight, depressed survival, malformation, and abnormal chromosome division of eggs and larvae (Westin et al. 1985; Longwell et al. 1992; Varanasi 1992; Longwell et al. 1996; Colborn and Thayer 2000). Maternal effects may be biomagnified by contaminants in the water column in some environments (Longwell et al. 1992). Experiments with Atlantic croaker indicated maternal transfer of PCBs to eggs and larvae would result in reduced growth rates and impair behaviors associated with avoidance of predators (McCarthy et al. 2003)."

Contaminants present in the water column were implicated in the decline of Chesapeake Bay striped bass recruitment. The report noted that contaminants could depress productivity in striped bass. Consumption-related advisories could decrease the desirability of striped bass leading to adverse impacts to both commercial sales and recreational fishing. Although the report focused on organic contaminants, similar bioaccumulative effects have been documented when selenium levels are elevated in the water. Dr. Lemly's research indicates that selenium levels in fish eggs can be thousands of times higher than the waterborne selenium concentration. He states, "Once consumed, dietary selenium readily accumulates in tissues, sometimes to levels that are several thousand times the initial waterborne concentration. In fish and birds, selenium is passed from parents to offspring through the eggs, which can kill developing embryos before hatching, and also result in teratogenic poisoning that produces a variety of skeletal deformities and associated death in the young."

Fisheries

As the second largest and arguably most notable drainage of the Chesapeake Bay watershed, Potomac River is home to many resources that are managed and protected by Maryland Department of Natural Resources. The proposed discharges at Quantico Creek, a stream tributary to Potomac River, could threaten these resources by discharging contaminants that could negatively impact fishes and aquatic invertebrates and by extension, valuable fisheries of Potomac River. In the 2014 Chesapeake Watershed Agreement, a specific goal regarding toxic contaminants committed the states to "continually improve practices and controls that reduce and prevent the effects of toxic contaminants...". In addition to maintaining that commitment, the State of Maryland has an interest in preventing pollution to Virginia waters because of a shared licensing reciprocity agreement that allows Maryland anglers to harvest legally caught fish from Virginia's portion of Potomac River.

Potomac River fisheries are nationally recognized. In 2015, there were over 50 organized largemouth bass tournaments that targeted Potomac River for competitive sport fishing. These tournaments contributed over 1500 anglers who fished Maryland and Virginia waters and thousands of dollars to local economies. Fishing is an important source of recreation for many Marylanders. The latest recreational angler survey by the U.S. Fish and Wildlife Service reported that there were 426,000 recreational fishers who spent $754,959,000 in 2011 on fishing-related expenses in Maryland. Many of these fishers routinely target Potomac River for recreation.

Tidal freshwater of the Potomac River provides food for people who live in Maryland. In studies conducted by Maryland Department of Natural Resources in the late-1980's, recreational fishers harvested about 1/3 of the fish caught from Potomac River and these fish included striped bass, catfish, largemouth bass, yellow perch, sunfishes, and white perch. White perch and catfish were the most harvested. In 2015 nearly 12,000 pounds of white perch were commercially harvested from Maryland's Potomac River. That harvest is eclipsed by the nearly 134,000 pounds of catfishes that were

commercially harvested from Maryland's Potomac River in 2015. Another important species that is becoming highly sought for food is northern snakehead. The northern snakehead is a species that Maryland Department of Natural Resources encourages people to eat as a means to control its spread and biomass. A single snakehead tournament in 2015 reeled in 1871 pounds of snakehead. As a sign of this growing, but small fishery, in 2015 over 4000 pounds of snakehead was commercially harvested, which is 9-times that harvested in 2012. Like white perch and catfish, northern snakeheads occur in Quantico Creek at the site of proposed discharge.

One of the most important commercial and sport fishes in Maryland and the east coast is striped bass. Striped bass spawn in 22,162 hectares of fresh to low salinity tidal reaches in Potomac River, including Quantico Creek and areas upstream and downstream of the proposed discharge site. Contaminants that are flushed into Potomac River and Quantico Creek may ultimately impair spawning habitat for striped bass and cause problems with spawning success of striped bass. Toxic water quality conditions (low conductivity, alkalinity, hardness, and pH and high levels of trace metals) and low water temperatures (< 12 °C) encountered by striped bass larvae were implicated in episodic mortalities in some tributaries in the 1980s. While contaminants were not the sole source of problems with striped bass, larvae are sensitive to contaminants within the water column (usually metals) and exposure to an intense influx of compounds could threaten year-class strength. Contaminants could depress productivity, requiring overly conservative fishing regulations to compensate. Consumption-related advisories may lower desirability of striped bass as table-fare, impacting both commercial sales and recreational participation.

In addition to nationally popular fisheries for largemouth bass and striped bass, as well as subsidence fisheries in the Potomac River, factors that affect Quantico Creek may also affect ecotourism of nearby nationally recognized ecosystems. Quantico Creek is located downstream Mattawoman Creek, which was listed as one of the Nation's most endangered rivers by American Rivers in 2012. Quantico Creek also lies upstream of the proposed National Marine Sanctuary, Mallows Bay. In 2015, the Obama administration recognized the historic and ecological significance of the Mallows Bay Sanctuary, which is a 14-square mile sanctuary that stretches from Maryland and across the river to Virginia. There are only 14 other marine sanctuaries in the United States. Both Mattawoman Creek and the proposed area for the Mallows Bay Sanctuary are important ecotourist attractions. Actions that threaten the integrity of these habitats could negatively affect both fisheries and ecotourism.

Questions and Concerns

- The Potomac Riverkeeper and the Sierra Club, represented by the Southern Environmental Law Center (SELC), filed a Notice of Intent (NOI) to sue Dominion for "serious and ongoing violations of the Clean Water Act at the Possum Point Power Plant" in September 2014. Specific allegations in the NOI include the following:
    - Abandoned ash ponds A, B, and C, are leaking contaminated wastewater containing arsenic, barium, nickel, selenium, and other metals directly into Quantico Creek and into groundwater connected to Quantico Creek. These ponds are unlined pits that were excavated into existing wetlands in the 1950s.
    - Two active ash ponds, D and E, are leaking contaminated wastewater into Quantico Creek and into groundwater connected to Quantico Creek. Groundwater monitoring reports have detected barium, copper, cadmium, nickel, manganese, selenium, zinc, and other metals in monitoring wells below or adjacent to the ponds. Manganese has been documented at 66 times the Virginia groundwater standard, zinc at 64 times the standard, iron at 127 times the standard, and cadmium at 46 times the standard.
    - Water sampling conducted on July 2, 2014 indicates that Ash Pond E is leaking contaminated wastewater directly into Quantico Creek. Water samples collected at the base of a concrete pipe that conveys water from the toe of ash pond E under Possum Point Road had elevated levels of arsenic, cadmium, and zinc.

The NOI states that the discharges of contaminated wastewater from four of the five ponds at Possum Point Power Plant into Quantico Creek are "wholly unauthorized and violate the Clean Water Act." It further states that, "contamination of groundwater flowing to Quantico Creek from all five lagoons is wholly unauthorized and violates the Clean Water Act" and "Dominion is violating the express terms of its VPDES permit for the Possum Point Power Plant in violation of the Clean Water Act."

Part II.R of Dominion's VPDES permit states:

> *"Solids, sludges, or other pollutants removed in the course of treatment or management of pollutants shall be disposed of in a manner so as to prevent any pollutant from such materials from entering state waters."*

Part II.F of the permit states:

> *"Except in compliance with this permit, or another permit issued by the Board, it shall be unlawful for any person to:*
> 1. *Discharge into state waters sewage, industrial wastes, or other wastes, or any noxious or deleterious substances; or*
> 2. *Otherwise alter the physical, chemical or biological properties of such state waters and make them detrimental to the public health, or to animal or aquatic life, or to the use of such waters for domestic or industrial consumption, or for recreation, or for other uses."*

The documented discharges of contaminated wastewater into groundwater and surface water from the ash ponds do not appear to satisfy these permit conditions.

- There do not appear to be any discharge limitations on the effluent from Outfall 010 – Ash Pond D Toe Drain in the draft permit? MDNR respectfully asks why no such limitations are established. This outfall discharges leachate directly to Quantico Creek. The permit also states that Ash Pond D may be used as a repository for dredge spoil material from operations and activities at Possum Point Power Station and also as a repository for dredge spoil material that is not related to operations at Possum Point.

- The total volume of discharge in the permit is impossible to calculate from the information contained in the draft permit and there are no discharge flow limits in the permit. The flow from the Ash Pond D Toe Drain (Outfall 010) is described simply as "variable" in the permit. Neither VADEQ nor the public is able to quantify the concentration and/or total mass of pollutants that will be discharged into Quantico Creek and the Potomac River from the information contained in the draft permit.

- The quantification level (QL) for many of the regulated pollutants in the draft permit is much higher than EPA's National Recommended Water Quality Criteria for Aquatic Life. According to the EPA, aquatic life criteria for toxic chemicals are, "the highest concentration of specific pollutants or parameters in water that are not expected to pose a significant risk to the majority of species in a given environment." The QL for arsenic is 180 micrograms/liter but EPA's chronic saltwater criterion maximum concentration is 36 micrograms/liter. Similarly, the QL for mercury is 1.0 micrograms/liter and EPA's freshwater criterion continuous concentration is 0.77 micrograms/liter. The QLs specified in the draft permit are too high since concentrations of regulated pollutants that are toxic to aquatic life would be undetected during chemical analysis using the current QLs.

- The calculation method outlined in the permit allows the monthly average to be computed using "defined zeros" for concentration data equal to or above the QL. This methodology will skew the reported monthly averages and is of particular concern for this permit since the allowed QLs in the permit are already much higher than EPA's Water Quality Criteria for Aquatic Life. The following example illustrates how using the method outlined in the draft permit could lead to monthly average discharge concentrations exceeding the draft permit limits to be allowed under the permit:

    - The allowed monthly average discharge concentration for arsenic is 300 micrograms/liter and the QL is 180 micrograms/liter. Suppose the actual arsenic levels in the four aliquots used for compositing to calculate the monthly average are 150, 150, 400, and 580 micrograms/liter. The actual monthly average would be 320 micrograms/liter which exceeds the allowed discharge concentration in the permit for arsenic. However, using the methodology allowed in the permit (using defined zeros for any concentration below the QL), the monthly average concentration for arsenic would be 245 micrograms/liter and the discharge would be allowed under the permit.

- Several Virginia lawmakers sent a letter, dated June 15, 2015, to the Virginia Secretary of Natural Resources outlining their concerns regarding Dominion's Possum Point Power Plant coal ash ponds and the "cap-in-place" proposal for closing the ponds. The delegates were concerned about the impact of the pollutants on Quantico Creek since the creek is a popular recreational and commercial fishery and serves as a food source for some Virginia residents. The following points of concern were included in the letter:

    - The delegates requested that VADEQ obtain recent sampling data for several monitoring wells in close proximity to residences. If no recent monitoring has been conducted, the delegates stated that the wells should be tested as soon as possible due to recent reports that, "93% of drinking water wells located near coal ash ponds (in North Carolina) are contaminated with dangerous heavy metals like hexavalent chromium, lead and vanadium, and public health agencies have advised residents not to drink or use well water for cooking."
    - The letter also requested that VADEQ work with the Virginia Department of Health to offer free testing of private drinking water wells for residents living along Possum Point Road near the coal ash ponds. The delegates also suggested that VADEQ should offer similar water well testing to residents throughout Virginia living in close proximity to other coal ash ponds.
    - The precautionary approach was suggested as a feasible alternative to the "cap-in-place" proposal. This approach would require Dominion to relocate the toxic waste in the ash ponds to dry, lined landfills located away from any waterways and drinking water sources. Concerns with the "cap-in-place" option proposed by Dominion include the possibility of leachate leaking through the sides and bottoms of the capped and closed ash ponds.
    - The delegates urged VADEQ to consider the history of contamination at the site and to ensure that, "any closure plan permanently halts the discharge of pollutants from these coal ash ponds and protects Quantico Creek, the Potomac River and the health of nearby residents."

MDNR shares many of these concerns and would like to know if the Virginia Secretary of Natural Resources responded to the concerns and requests outlined in the letter from the Virginia delegates? If so, can the response be shared with MDNR and other parties of interest? As noted, the concerns expressed by the Virginia delegates in their letter are shared by Maryland due to the potential for downstream impacts to commercial and recreational fisheries in Maryland State waters as a result of the permitted discharges of pollutants in the draft permit.

The discharge points in the draft permit are located a short distance north of the transition zone boundary for the Potomac River Basin. This is significant because Virginia's freshwater aquatic life criteria for pollutants apply to the permit instead of the saltwater aquatic life criteria. The freshwater and saltwater criteria for specific pollutants can vary greatly and it is impossible to know if the allowed discharge concentrations (based on freshwater aquatic life criteria) will be sufficiently diluted to attain saltwater aquatic life criteria by the time the discharged wastewater plume migrates to saltwater. For example, the freshwater aquatic life acute water quality criterion for arsenic is 340 micrograms/liter and the saltwater acute aquatic life criterion for arsenic is 69 micrograms/liter. MDNR would like greater assurance than is currently provided that pollutant concentrations in the permitted discharges from Possum Point will meet the saltwater aquatic life criteria when the pollutant plume reaches saltwater located a short distance away from the discharge point.

Possum Point Power Plant is located in tidal waters at the interface of the boundary line between freshwater and saltwater as defined by Virginia. The area is a highly dynamic aquatic environment subject to tidal movements and varying degrees of mixing between freshwater and saltwater. Using the most conservative water quality standards for the pollutants in the draft permit would offer the greatest protection for human health and the environment. For example, the Virginia human health water quality criterion for thallium (which is calculated to protect human health from toxic effects through fish consumption) is 0.47 micrograms/liter but the proposed discharge concentration for thallium for Ash Pond E is 0.94 micrograms/liter. How can this be considered protective of human health?

Finally, MDNR respectfully acknowledges the permitting authority that rests with VDEQ with regard to this permit application. Moreover, we appreciate the opportunity to submit this comment letter for the draft Virginia Pollutant Discharge Elimination System (VPDES) Permit for Dominion Virginia Power's Possum Point Power Station, VPDES Permit No. VA0002071.

In closing, we hope that VDEQ will take whatever time is required to give due consideration to our comments and questions to assure the aquatic life and human health issues and concerns we all share, which we have identified in this letter, can be properly addressed through use of best available measures.

If you have any questions or concerns regarding the comments, you may contact Tony Redman, Director, Maryland DNR Project Review Division, at 410.260.8336 or tony.redman@maryland.gov.

Sincerely,

Mark J. Belton, Secretary

Cc: Ben Grumbles, Secretary, Maryland Department of the Environment
David Goshorn, Ph.D., Assistant Secretary, Aquatic Programs
Christine Conn, Ph.D., Director, Integrated Policy and Review
David Blazer, Director, Fisheries Services